

MEMORANDUM

NATIONAL SECURITY COUNCIL

REFER TO DOS

ACTION/2101 Follow On

August 6, 1974

SECRET/XGDS(3)

DOS REVIEWED 18-Mar-2011: NO OBJECTION TO DECLASSIFICATION

MEMORANDUM FOR: SECRETARY KISSINGER

FROM:

MICHAEL A. GUHIN

THRU:

DAVID D. ELLIOTT

SUBJECT:

Possible International Restraints on  
Environmental Warfare

OSD REVIEWED 15-Mar-2011: NO OBJECTION TO DECLASSIFICATION

As a result of the interagency review of this subject in May, all agencies except the JCS consider that some restraints on environmental warfare are in our interest. The JCS prefer no restraints but consider the restraints recommended by OSD below acceptable.

DOD's summary of the military aspects, the Under Secretaries Committee study of possible international restraints, agency views, and my analytical summary are at marked tabs.

To facilitate the near term decision on whether to give favorable consideration to the Soviet suggestion that the July summit communique include agreement to enter into discussions on prohibiting the potential use of environmental modification techniques for military purposes, the interagency report examines three options: (1) accept no restraints on military use of environmental warfare; (2) accept prohibitions on any military use of environmental modification techniques having long-lasting, widespread, or especially severe effects; and (3) accept prohibitions on any military use of such techniques for hostile purposes.

For purposes of this study, weather, climate, ocean, and terrestrial modification techniques are included. Of these, there presently exists an operational or near operational capability for only a few types of weather modification (for example, fog and precipitation modification).

OSD recommends prohibiting "environmental warfare" defined as any military use of weather, climate, ocean, or terrestrial modification techniques having long-lasting, widespread, or especially severe effects. This would in effect preclude all hostile uses except for tactical fog or precipitation modification. Neither this option nor the one supported by State and ACDA below would prohibit weather modification techniques solely to protect forces from natural hazards or fog modification to aid in search and rescue missions.

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No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1

This choice would (1) rule out the most dangerous and destructive possibilities (most of which would have limited if any military application should they ever come to be developed); (2) allay some of the domestic and international concerns; (3) limit an area of possible arms competition; and (4) be verifiable within reasonable limits of error.

On the other hand, this choice would (1) be criticized internationally and domestically as proposing to rule out everything except the things we know how to do and have done (rainmaking in SEA); (2) be far more difficult politically to negotiate on a multilateral basis; and (3) hamper possible development of international guidelines for civil environmental modification efforts having cross-border effects since these would probably proceed on a "peaceful purposes only" premise.

Although preferring no restraints, the JCS consider these prohibitions acceptable and note that their adoption would do no serious damage to our military posture.

State and ACDA strongly recommend prohibiting "environmental warfare" defined as precluding those activities under OSD's position plus precipitation and fog modification for clearly hostile purposes as the basis for discussions with the Soviets and subsequent multilateral effort. They believe it is the only basis on which we could hope to succeed in seeking multilateral agreement after bilateral discussions with the Soviets.

This choice would (1) meet with more general acceptance as a definition of "environmental warfare" since all clearly hostile uses would be prohibited; (2) be less ambiguous and much easier to negotiate on a multilateral basis than OSD's choice; and (3) enhance the development of international guidelines for civil applications having cross-border effects since it would constitute a "peaceful uses only pledge."

On the other hand, this choice would (1) foreclose existing and prospective weather modification options (fog and precipitation) which might be employed to gain tactical advantage in some conflict situations (if natural meteorological conditions permitted); and (2) present some verification problems since tactical employment of weather modification techniques might not be detectable.

Following on this interagency examination of options regarding restraints on environmental warfare, the President agreed at the summit in Moscow to advocate such restraints and to begin US/USSR discussions this year to explore the problem and what steps might be taken to bring about effective measures against the dangers of using environmental modification techniques for military purposes.

Pursuant to the decision reflected in the US/USSR communique and the joint statement on environmental warfare, we have drafted two proposed NSDMs

(Tabs A and B) which would instruct the NSC Under Secretaries Committee to prepare a scenario and approach for discussions with the Soviets on possible restraints. The NSDMs differ only in the following respect:

- The NSDM at Tab A would reflect a decision that the US approach to these exploratory discussions with the Soviets should be consistent with the restraints supported by OSD and considered acceptable by the JCS. The only basic difference between OSD/JCS and State/ACDA is that the former wish to retain the option to use precipitation and fog modification techniques for hostile purposes.
- The NSDM at Tab B would not specify a particular US approach for these exploratory discussions with the Soviets on possible restraints. Since we know next to nothing about what the Soviet thinking is in this area, we could conduct preliminary talks to determine the general outline of their position and its relation to our concepts before making any decision on a US approach to possible restraints.

State (Sonnenfeldt) prefers the NSDM at Tab B. He believes the question of options need not be engaged at this stage of the process.

The NSC Staff (Kennedy, Lodal, Clift, and Guhin/Elliott) prefer the NSDM at Tab A. We believe the US should structure its exploratory talks on the basis of a preferred approach, and that this approach should be consistent with the position supported by OSD and the JCS—focusing on activities which could be subject to reasonable verification. This would not preclude exploratory discussions and perhaps a later US decision on broader restraints if the Soviets raise them.

We recognize that once we begin such discussions, particularly if and when a multilateral agreement were desired, we will in all likelihood have to address the question of a "peaceful uses only" policy or prohibitions along the lines recommended by State and ACDA. This prospect does not appear particularly troublesome since the military case, including our operational rainmaking experience in SEA, for preserving the option for hostile uses of fog and precipitation modification techniques does not appear very strong. We believe, however, that we should have a preference in mind (and one supported by OSD and the JCS) for the US/USSR discussions rather than a completely open-ended approach.

The memorandum at Tab 1 would forward the draft NSDM at Tab A for the President's approval if you wish to raise this with him again.

#### RECOMMENDATION:

That you issue the NSDM at Tab A (which directs that the US approach to exploratory discussions with the Soviets be consistent with the OSD/JCS and NSC Staff position).

APPROVE \_\_\_\_\_

DISAPPROVE \_\_\_\_\_

[Prefer and signed NSDM at  
Tab B (specifying no US approach  
on possible restraints for these  
exploratory discussions) as recom-  
mended by State (Sonnenfeldt) and  
probably preferred by ACDA.]

OTHER \_\_\_\_\_

THE WHITE HOUSE

WASHINGTON

Re 2101

SECRET

August 5, 1974

David Elliott:

With regard to the General's request that the Environmental Warfare paper be updated, he recognized that the July 16 paper stood on its own insofar as it reflected the outcome of the Summit. Basically, what he wanted, however, was a new covering memorandum to the July 16 package that summarized the entire audit trail of the action making reference with appropriate tabs to the study itself and agency views thereon. In addition, although the General did not ask about it, does the NSDM need to go to the President since it reflects a split in agency views. Frankly I doubt it but I believe you may wish to include a HAK memorandum to the President to cover that contingency.

Bud McFarlane



SECRET

MEMORANDUM

NATIONAL SECURITY COUNCIL

ACTION/2101

August 2, 1974

SECRET/XGDS(3)

NOTE FOR: GENERAL SCOWCROFT  
FROM: MICHAEL GUHIN *MG*  
THRU: DAVID ELLIOTT *DE*  
SUBJECT: Attached

The attached package forwarding a proposed NSDM on environmental warfare, dated July 16, represents an updating of the May 31 package on said subject in light of the President's decision and agreement in Moscow.

The July 16 package requires no further updating, but I have retyped the proposed NSDM to extend the due date for an Under Secretaries Committee's report to September 16.

SECRET/XGDS(3)

THE WHITE HOUSE  
WASHINGTON

7/29/74

→ Mike Rubin:  
Update memo  
memo for  
retransmission

Q

## MEMORANDUM

NATIONAL SECURITY COUNCIL  
 FOLLOW-ON  
 ACTIONS/1921 & 2101  
 July 16, 1974

SECRET/XGDS(3)

MEMORANDUM FOR: SECRETARY KISSINGER  
 FROM: MICHAEL A. GUHIN  
 THRU: DAVID D. ELLIOTT  
 SUBJECT: Proposed NSDM on Environmental Warfare

Pursuant to the decision reflected in the US/USSR Communiqué and the Joint Statement on Environmental Warfare, both the attached draft NSDMs would instruct the NSC Under Secretaries Committee to prepare a scenario and approach for discussions with the Soviets on possible restraints.

The NSDMs differ only in the following respect:

- The NSDM at Tab A would reflect a decision that the US approach to these exploratory discussions with the Soviets should be consistent with the restraints supported by OSD and considered acceptable by the JCS. OSD and the JCS wish to retain the option to use precipitation and fog modification techniques for hostile purposes. As noted in our previous memoranda, (1) former Deputy Secretary Rush and ACDA Director Ikle prefer prohibiting all hostile uses of environmental modification techniques; and (2) we will in all likelihood have to address this question again sometime later, particularly if and when a multi-lateral agreement is desired.
- The NSDM at Tab B would not specify a particular US approach for these exploratory discussions on possible restraints. Since all our discussions with the Soviets have been of a very general nature, and since we know next to nothing about what their thinking is in this area, we could conduct preliminary talks to determine the general outline of their position and its relation to our concepts before making any decision on a US approach to possible restraints. OSD and the JCS may well object to an open-ended approach since the exploratory discussions would not then be geared with a clear US preference in mind.

I have discussed this with State (Sonnenfeldt). He prefers the NSDM at Tab B since he believes the question of options need not be engaged at this stage of the process.

SECRET/XGDS(3)

SECRET/XGDS(3)

*JK*  
Dick Kennedy, Jan Lodal, Denis Clift, and Guhin/Elliott prefer the NSDM at Tab A. We believe the US should structure its exploratory talks on the basis of a preferred approach, and that this approach should be consistent with the position supported by OSD and the JCS—which position focuses on activities which could be verified within reasonable limits of error. This would not preclude exploratory discussions and perhaps a later US decision on broader restraints if these are raised by the Soviets.

RECOMMENDATION:

That you issue the NSDM at Tab A which directs that the US approach to exploratory discussions be consistent with the OSD/JCS position.

Approved \_\_\_\_\_

Disapproved \_\_\_\_\_

[Have issued NSDM at Tab B recommended by State (Sonnenfeldt) and probably preferred by ACDA.]

SECRET/XGD

MEMORANDUM

## NATIONAL SECURITY COUNCIL

SECRET/NODIS/XGDS(3)ACTIONS/1921 & 2101

TOP SECRET ATTACHMENT

May 31, 1974

MEMORANDUM FOR: SECRETARY KISSINGER

FROM: MICHAEL A. GUHIN *mg*

THRU: DAVID D. ELLIOTT *DD*

SUBJECT: Possible International Restraints on Environmental Warfare

As a result of the interagency review of this subject, all agencies except the JCS consider some restraints are in our interest. The JCS prefer no restraints but consider the restraints recommended by OSD below acceptable.

This situation can allow us to give favorable consideration to General Secretary Brezhnev's suggestion in March that the summit communique include agreement to enter into discussions regarding possible restraints on using environmental modification techniques as weapons of war.

DOD's summary of the military aspects, the Under Secretaries Committee study of possible international restraints, agency views, and my analytical summary are at marked tabs.

As detailed below, the purpose of including this subject on the Verification Panel agenda is to determine if the agencies can agree that we can now decide to enter into discussions with the Soviets without settling specific agency differences on the options presented in the report.

As a review of the options summarized below indicates, I believe it will be possible to reach agreement on the desirability of discussions with the Soviets for announcement at the summit. Your purpose in this meeting will be to gain interagency endorsement of this objective (with such agreement based on Option 2 below).

To facilitate the near term decision on whether to give favorable consideration to the Soviet suggestion, the interagency report examines three options regarding possible restraints on environmental warfare. For purposes of this study, weather, climate, ocean, and terrestrial modification techniques are included. Of these, there presently exists an operational or near operational capability for only a few types of weather modification (fog and precipitation modification).

SECRET/NODIS/XGDS(3)

Option 1. Accept no international restraints on military use of environmental modification techniques as weapons of war.

Advantages. This would (1) foreclose no possibly useful military options; and (2) retain the right to use current and potential operational weather modification techniques (fog and precipitation modification) which could have tactical military advantages in some situations where natural meteorological conditions permitted.

Disadvantages. This would (1) provide no basis for any US-Soviet initiative to explore possible restraints; (2) possibly hamper future international scientific cooperation in these areas, including efforts to develop guidelines for civil environmental modification activities having cross-border effects; and (3) possibly lead to the emergence of arms competition in this area and to increased concern about environmental warfare.

The JCS recommend this option. However, should some restraints be deemed desirable, the JCS consider the following option acceptable.

Option 2. Be willing to discuss and ultimately accept prohibiting "environmental warfare" defined as any military use of weather, climate, ocean, or terrestrial modification techniques having long-lasting, widespread, or especially severe effects. This would in effect preclude all hostile uses except for tactical fog or precipitation modification. Neither this option nor the following one would prohibit weather modification techniques solely to protect forces from natural hazards or fog modification to aid in search and rescue missions.

Advantages. This would (1) rule out the most dangerous and destructive possibilities (most of which would have limited if any military application should they ever come to be developed); (2) allay some of the domestic and international concerns; (3) limit an area of possible arms competition; and (4) be verifiable within reasonable limits of error.

Disadvantages. This would (1) be criticized internationally and domestically as proposing to rule out everything except the things we know how to do and have done (rainmaking in SEA); (2) be far more difficult politically to negotiate on a multilateral basis and present more problems of definition than the following option; and (3) hamper possible development of international guidelines for civil environmental modification efforts having cross-border effects since these would probably proceed on a "peaceful purposes only" premise.

OSD recommends this option; the JCS consider it acceptable and note that its adoption would present no serious damage to our military posture. State notes that this option could provide the basis only for some beginning bilateral discussions with the Soviets. State believes it would not be negotiable on any broader basis, and strongly recommends Option 3 below.

Option 3. Be willing to discuss and ultimately accept prohibiting "environmental warfare" defined as precluding those activities under Option 2 plus precipitation and fog modification for clearly hostile purposes.

Advantages. This would (1) allow a "peaceful uses only" pledge; (2) meet with more general acceptance as a definition of "environmental warfare" since all clearly hostile uses would be prohibited; (3) be less ambiguous than Option 2 and much easier to negotiate on a multilateral basis; and (4) enhance the development of international guidelines for civil applications having cross-border effects.

Disadvantages. This would (1) foreclose existing and prospective weather modification options (fog and precipitation) which might be employed to gain tactical advantage in some conflict situations (if natural meteorological conditions permitted); and (2) present greater verification problems than Option 2 since tactical employment of weather modification techniques might not be detectable.

State and ACDA strongly recommend this option as the basis for discussions with the Soviets and subsequent multilateral effort. They believe it is the only basis on which we could hope to succeed in seeking multilateral agreement later.

My View. The fundamental difference between the agencies is that OSD and the JCS wish to retain the right to use precipitation and fog modification techniques for hostile purposes.

This issue need not be decided now in order (1) to enter into discussions with the Soviets on possible international restraints on environmental warfare, and (2) to announce this decision in a summit communique. If State and ACDA concur, we could initially conduct such discussions on our side on the basis of OSD's preferred position, and defer decision on any broader restraints pending developments in these discussions.

Once we began such discussions, particularly if and when a multilateral agreement were desired, we would in all likelihood have to address the question of a "peaceful uses only" policy or prohibitions along the lines recommended by State and ACDA. This prospect does not appear particularly troublesome since the military case, including our operational rainmaking experience in SEA, for preserving the option for hostile uses of fog and precipitation modification techniques does not appear very strong. State's argument for a multilateral agreement along the lines of prohibiting all clearly hostile uses may therefore be in our long-run interest, but that question can be addressed later.

I recommend therefore that we (1) enter into discussions with the Soviets (which decision could be announced in a summit communique), and (2) conduct

these discussions initially on the basis on the position supported by OSD. There may well be some criticism by the Soviets or in the public airing of the decision that we are not including in these discussions the only things we know how to do and have done. Indeed, our use of rainmaking in Southeast Asia from 1966-1972 has been controversial. However, this problem should prove manageable until such time as we need address the question of broader restraints.

The purpose of raising this subject at the Verification Panel meeting is to get agency agreement that we could enter into discussions initially on the basis of OSD's preferred position. Your talking points at marked tab are structured accordingly.

The draft memorandum for the President (Tab 1) reflects this recommendation which, I believe, will be accepted in the meeting. A draft implementing NSDM is at Tab A. It would also request State, in coordination with DOD and ACDA, to prepare an action plan for steps to be taken following any announcement. (I will work with State on draft communique language for a US-Soviet announcement and an accompanying fact sheet.)

Dick Kennedy, Jan Lodal, and Denis Clift have concurred.

RECOMMENDATIONS:

1. That you note your talking points at marked tab.
2. If it is agreed at the meeting to proceed along the lines of the above recommendation, that you forward the memorandum for the President (Tab 1);
3. If he approves, that you issue the NSDM at Tab A.

MEMORANDUM

## NATIONAL SECURITY COUNCIL

SECRET/NODIS/XGDS(3)ACTIONS/1921 & 2101

May 31, 1974

MEMORANDUM FOR: SECRETARY KISSINGER

FROM: MICHAEL A. GUHIN *MA*

SUBJECT: Possible International Restraints on  
Environmental Warfare

All agencies except State now agree with the recommendation in the attached package. The recommendation is that we enter into discussions with the Soviets on the above subject (which could be announced in a summit communique as suggested in March by General Secretary Brezhnev) initially on the basis of the restraints recommended by OSD.

As noted in the attached, the JCS prefer no restraints but consider OSD's position acceptable. ACDA and State have strongly recommended slightly broader restraints than those supported by OSD.

However, I have discussed this with Ikle and he can support moving ahead now on the basis of OSD's position. He believes that any language regarding agreement to enter into discussions with the Soviets should be couched in a broad peaceful uses framework, and I think this can be managed. Therefore, the only unresolved disagreement centers about Deputy Secretary Rush's strong support for broader restraints.

If you agree with the recommendation after reading the attached memorandum, you may wish either to forward the memorandum to the President for decision or to confirm agency views at the Verification Panel meeting scheduled for Monday, June 4. Dick Kennedy and I believe the issue can be handled by memorandum and need not be raised at the meeting.

SECRET/NODIS/XGDS(3)TOP SECRET/NODIS/XGDS(3) ATTACHMENT

MEMORANDUM

## THE WHITE HOUSE

WASHINGTON

SECRET/XGDS(3)ACTION/2101 - FOLLOW ON

August 6, 1974

MEMORANDUM FOR: THE PRESIDENT

FROM: HENRY A. KISSINGER

SUBJECT: Possible International Restraints on  
Environmental Warfare

As a result of the interagency review of this subject in May, all agencies except the JCS consider that some restraints on environmental warfare are in our interest. The JCS prefer no restraints, but consider the restraints recommended by OSD below acceptable since they would do no serious damage to our military posture.

All agencies also agree that there should be no restraints on using weather modification techniques solely to protect forces from natural hazards and fog modification to aid in search and rescue missions.

OSD believes that we should prohibit the use of "environmental warfare" defined as any military use of weather, climate, ocean, or terrestrial modification techniques which could have long-lasting, widespread, or especially severe effects. This would in effect preclude all hostile uses except for tactical fog or precipitation modification, which could prove useful in some situations if natural meteorological conditions permitted. This choice would be verifiable within reasonable limits of error and is considered acceptable by the JCS.

State and ACDA strongly believe that we should prohibit not only those restraints recommended by OSD but also restraints on precipitation and fog modification for clearly hostile purposes. This is the only choice which would constitute a "peaceful uses only" policy and meet with more general acceptance as a definition of "environmental warfare." However, tactical use of fog and precipitation modification would be more difficult to verify than the restraints recommended by OSD.

Following on this interagency examination and agreement that some restraints are in our interest, you agreed at the summit in Moscow to advocate bringing about the most effective measures possible against the dangers of using environmental modification techniques for military purposes and to begin discussions with the Soviets this year to explore the problem and what steps might be taken to bring about effective restraints.

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SECRET/XGDS(3)

2

Pursuant to your decision set forth in the US/USSR Joint Communique and the Joint Statement on Environmental Warfare, the draft NSDM at Tab A would instruct the NSC Under Secretaries Committee to prepare a scenario and approach for discussions with the Soviets to begin this October. The NSDM would also reflect a decision that the US approach to these exploratory discussions should be consistent with the restraints supported by OSD and considered acceptable by the JCS.

This would not preclude discussions and perhaps a later US decision on broader restraints if the Soviets raise them. Indeed, once we begin such discussions, particularly if and when a multilateral agreement were desired, we will in all likelihood have to address the question of a "peaceful uses only" policy or prohibitions along the lines recommended by State and ACDA. This prospect does not appear very troublesome since the military case, including our operational rainmaking experience in SEA from 1966-1972, for preserving the option for hostile uses of fog and precipitation modification techniques does not appear very strong.

There may well be some criticism by the Soviets or in any public airing of our approach that we are not including in these discussions the only things we know how to do and have done. Our use of rainmaking in SEA has been controversial. That problem should prove manageable, however, and I believe we should have a preference in mind for discussions with the Soviets. The OSD/JCS preference would focus on those restraints which would be subject to reasonable verification.

RECOMMENDATION:

That you approve the NSDM at Tab A requesting a scenario and approach for discussions with the Soviets on measures against environmental warfare and directing that the US approach be consistent with the position supported by OSD and the JCS.

APPROVE \_\_\_\_\_

DISAPPROVE \_\_\_\_\_

SECRET/XGDS(3)

MEMORANDUM

## THE WHITE HOUSE

WASHINGTON

ACTIONS/1921 & 2101SECRET/NODIS/XGDS(3)

MEMORANDUM FOR: THE PRESIDENT

FROM: HENRY A. KISSINGER

SUBJECT: Possible International Restraints on  
Environmental Warfare

As a result of an interagency review, all agencies except the JCS consider that some restraints on environmental warfare are in our interest. The JCS prefer no restraints, but consider that the restraints recommended by OSD below are acceptable and would present no serious damage to our military posture.

This situation can allow us to give favorable consideration to General Secretary Brezhnev's suggestion in March that the summit communique include agreement to enter into discussions regarding possible restraints on using environmental modification techniques (for example, weather, climate, ocean, or terrestrial modification) as weapons of war.

All agencies have agreed that the specific difference between them regarding the desirable scope of possible restraints need not be settled now in order to decide to enter into discussions with the Soviets on this subject and to announce this decision in a summit communique. We could, thus, initially conduct such discussions on our side on the basis of OSD's preferred position as detailed below and defer decision on whether or not we should consider broader restraints, as supported by State and ACDA, pending developments in these discussions.

All agencies have also agreed that there should be no restraints on using weather modification techniques solely to protect forces from natural hazards or fog modification to aid in search and rescue missions.

OSD believes that we should be willing to discuss and ultimately accept prohibiting the use of "environmental warfare" defined as any military use of weather, climate, ocean, or terrestrial modification techniques which could have long-lasting, widespread, or especially severe effects. This would in effect preclude all hostile uses except for tactical fog or precipitation modification, which could prove useful in some situations if

SECRET/NODIS/XGDS(3)

natural meteorological conditions permitted. This option would be verifiable within reasonable limits of error. The JCS consider this option acceptable as noted above.

State and ACDA strongly believe that we should be willing to discuss and ultimately accept not only those restraints recommended by OSD but also restraints on precipitation and fog modification for clearly hostile purposes. This is the only choice which would constitute a "peaceful uses only" policy and meet with more general acceptance as a definition of "environmental warfare." However, tactical use of fog and precipitation modification would be more difficult to verify than the restraints recommended by OSD.

The fundamental difference between the agencies is that OSD and the JCS wish to retain the right to use precipitation and fog modification techniques for hostile purposes. Once we begin discussions on any restraints with the Soviets and possibly others later, particularly if and when a multilateral agreement were desired, we would in all likelihood have to address whether or not we should adopt a "peaceful uses only" policy or prohibitions along the lines recommended by State and ACDA. This may be in our long-run interest, but that question can be addressed later.

I recommend therefore that you approve our entering into discussions with the Soviets (which decision could be announced in a summit communique), and our conducting these discussions initially on the basis of the position supported by OSD. There may well be some criticism by the Soviets or in the public airing of the decision that we are not including in these discussions the only things we know how to do and have done. Indeed, our use of rainmaking in Southeast Asia from 1966-1972 has been controversial. However, that problem should prove manageable until such time as we need address the question of broader restraints.

A draft implementing NSDM at Tab A reflects this recommendation. It would also request the interested agencies to prepare an action plan for steps to be taken following any announcement. (I will work on communique language for a US-Soviet summit announcement.)

#### RECOMMENDATION:

That you approve our entering into discussions with the Soviets on possible restraints on environmental warfare, as reflected in the NSDM at Tab A.

APPROVE \_\_\_\_\_

DISAPPROVE \_\_\_\_\_

TALKING POINTS ON ENVIRONMENTAL WARFARE  
VERIFICATION PANEL MEETING  
Saturday, June 1, 1974

I have asked to discuss the question of possible international restraints on environmental warfare to see if we can agree on where we should go from here. As you know, the interagency report and agency views on this question have been submitted.

I should like to surface some of the differences to see if they need affect the near-term decision which is whether it is in our interest to give favorable consideration to General Secretary Brezhnev's suggestion in March that we agree to enter into discussions of possible restraints on using environmental modification techniques as weapons of war.

As I understand the issue:

- The JCS prefer no restraints in this area, but consider the following option, supported by OSD, acceptable.
- OSD prefers that we discuss and be willing to accept prohibitions on those environmental modification techniques which could have long-lasting, widespread, or especially severe effects (such as climate modification, generating earthquakes or tsunamis, or severe storm enhancement or steering).
- State and ACDA recommend that we not only discuss and be willing to accept the above prohibitions but also prohibitions on clearly hostile uses of weather modification (such as fog and precipitation modification techniques).

Is this a fair summation of agency preferences? (Yes)

Is it also clear that we are not talking about possible international restraints either on weather modification activities solely to protect forces from natural hazards or on R&D? (Yes)

Before forwarding this issue to the President, I should like to know if we cannot all agree that the differences between the two restraint options need not be decided now. This means we could decide now (1) to enter into discussions with the Soviets on possible international restraints in this area (which decision could be announced in a summit communique), (2) to conduct such discussions initially on our side on the basis of the option supported by OSD, and (3) defer any further decision regarding other restraints pending developments in these discussions.

Does ACDA agree with this approach? (Ikle may agree, while making a strong pitch for broader restraints. You should also seek Sisco's views and then Admiral Moorer's. General agreement should develop.)

I agree that once we get into discussions, particularly if and when a multilateral agreement were desired, we will probably need to address the question of broader restraints on use or a "peaceful uses only" policy. However, I also think that this matter should be addressed if and when we come to that issue in our discussions.

I will therefore forward the areas of agency preferences and agreement for the President's consideration.

NATIONAL SECURITY COUNCIL  
WASHINGTON, D.C. 20506

SECRET/XGDS(3)

National Security Decision Memorandum

TO: The Secretary of Defense  
The Deputy Secretary of State  
The Director, Arms Control and Disarmament Agency  
The Director of Central Intelligence

SUBJECT: International Restraints on Environmental Warfare

The President has reviewed the report of the NSC Under Secretaries Committee (USC) on possible international restraints on environmental warfare forwarded by the memorandum of the USC Chairman on May 10, 1974, and associated agency views regarding such restraints.

As reflected in the Joint Statement of the United States and the Soviet Union on July 3, 1974, the President has decided that it is in the United States' interests to consider with the USSR restraints on the use of environmental modification techniques for military purposes and, to this end, to enter into discussions with the Soviet Union to explore the possibility of such restraints.

The President has directed that the NSC Under Secretaries Committee prepare an appropriate scenario and approach for a meeting between the U.S. and the USSR to explore this issue as well as what steps might be taken to bring about the most effective measures possible in this area. These exploratory discussions should be designed so as not to prejudice in any way the options regarding the possible nature and scope of international restraints. The scenario and approach should be forwarded for the President's consideration no later than September 16, 1974.

Henry A. Kissinger

cc: The Chairman, Joint Chiefs of Staff

SECRET/XGDS(2)

NATIONAL SECURITY COUNCIL  
WASHINGTON, D.C. 20506

SECRET/XGDS(3)

National Security Decision Memorandum

TO: The Secretary of Defense  
The Deputy Secretary of State  
The Director, Arms Control and Disarmament Agency  
The Director of Central Intelligence

SUBJECT: International Restraints on Environmental Warfare

The President has reviewed the report of the NSC Under Secretaries Committee (USC) on possible international restraints on environmental warfare forwarded by the memorandum of the USC Chairman on May 10, 1974, and associated agency views regarding such restraints.

As reflected in the Joint Statement of the United States and the Soviet Union on July 3, 1974, the President has decided that it is in the United States' interests to consider with the USSR restraints on the use of environmental modification techniques for military purposes and, to this end, to enter into discussions with the Soviet Union to explore the possibility of such restraints.

The President has decided that the U.S. approach to these discussions should be consistent with Option 2 as presented in the USC report, which focuses on those environmental modification techniques having long-term, widespread, or especially severe effects.

The President has directed that the NSC Under Secretaries Committee prepare an appropriate scenario and approach for a meeting between the U.S. and the USSR to explore this issue as well as what steps might be taken to bring about the most effective measures possible in this area. The scenario and approach should be forwarded for the President's consideration no later than September 16, 1974.

Henry A. Kissinger

cc: The Chairman, Joint Chiefs of Staff

SECRET/XG No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1

**NATIONAL SECURITY COUNCIL**  
WASHINGTON, D.C. 20506

SECRET/XGDS(3)

National Security Decision Memorandum

TO:                   The Secretary of Defense  
                      The Deputy Secretary of State  
                      The Director, Arms Control and Disarmament Agency  
                      The Director of Central Intelligence

SUBJECT:            International Restraints on Environmental Warfare

The President has reviewed the report of the NSC Under Secretaries Committee (USC) on possible international restraints on environmental warfare forwarded by the memorandum of the USC Chairman on May 10, 1974, and associated agency views regarding such restraints.

As reflected in the Joint Statement of the United States and the Soviet Union on July 3, 1974, the President has decided that it is in the United States' interests to consider with the USSR restraints on the use of environmental modification techniques for military purposes and, to this end, to enter into discussions with the Soviet Union to explore the possibility of such restraints.

The President has decided that the U.S. approach to these discussions should be consistent with Option 2 as presented in the USC report, which focuses on those environmental modification techniques having long-term, widespread, or especially severe effects.

The President has directed that the NSC Under Secretaries Committee prepare an appropriate scenario and approach for a meeting between the U.S. and the USSR to explore this issue as well as what steps might be taken to bring about the most effective measures possible in this area. The scenario and approach should be forwarded for the President's consideration no later than August 15, 1974.

Henry A. Kissinger

cc: The Chairman, Joint Chiefs of Staff

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NATIONAL SECURITY COUNCIL  
WASHINGTON, D.C. 20506

SECRET/XGDS(3)

National Security Decision Memorandum

TO: The Secretary of Defense  
The Deputy Secretary of State  
The Director, Arms Control and Disarmament Agency  
The Director of Central Intelligence

SUBJECT: International Restraints on Environmental Warfare

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As reflected in the Joint Statement of the United States and the Soviet Union on July 3, 1974, the President has decided that it is in the United States' interests to consider with the USSR restraints on the use of environmental modification techniques for military purposes and, to this end, to enter into discussions with the Soviet Union to explore the possibility of such restraints.

The President has directed that the NSC Under Secretaries Committee prepare an appropriate scenario and approach for a meeting between the U.S. and the USSR to explore this issue as well as what steps might be taken to bring about the most effective measures possible in this area. These exploratory discussions should be designed so as not to prejudice in any way the options regarding the possible nature and scope of international restraints. The scenario and approach should be forwarded for the President's consideration no later than August 15, 1974.

Henry A. Kissinger

cc: The Chairman, Joint Chiefs of Staff

NATIONAL SECURITY COUNCIL  
WASHINGTON, D.C. 20506

SECRET/NODIS/XGDS(3)

National Security Decision Memorandum

TO: The Secretary of Defense  
The Deputy Secretary of State  
The Director, Arms Control and Disarmament Agency  
The Director of Central Intelligence

SUBJECT: International Restraints on Environmental Warfare

The President has reviewed the report of the NSC Under Secretaries Committee (USC) on possible international restraints on environmental warfare, as forwarded by the USC Chairman on May 10, 1974, and associated agency views regarding such restraints.

The President has decided that it is in the United States' interests to consider international restraints on environmental warfare and, to this end, to enter into discussions with the Soviet Union to explore the possibility of such restraints.

The President has decided that, from the U.S. side, the discussions will initially be conducted on the basis of Option 2 as presented in the USC report, which focuses on those environmental modification techniques having long-term, widespread, or especially severe effects.

The President has directed that the Department of State, in coordination with the Department of Defense and the Arms Control and Disarmament Agency, prepare an action plan outlining steps to be taken following any announcement of this decision. This action plan should be forwarded for consideration by the White House no later than June 17, 1974.

Both the fact and nature of this decision should be closely held on a strict need-to-know basis pending further discussions with the Soviet Union and possible White House announcement.

Henry A. Kissinger

cc: The Chairman, Joint Chiefs of Staff

NSC # 7401921

DEPARTMENT OF STATE  
WASHINGTON

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May 24, 1974

MEMORANDUM FOR THE ASSISTANT TO THE PRESIDENT  
FOR NATIONAL SECURITY AFFAIRS

Subject: Possible International Restraints  
on Environmental Warfare

General Scowcroft's memorandum of May 16, 1974, requests agency views concerning the options presented in the NSC Under Secretaries Committee's report of May 10 on "Possible International Restraints on Environmental Warfare". The Department of State strongly recommends that the President approve Option 3 of this report as a basis for discussing this matter bilaterally with the Soviet Union and for possible subsequent broader international action.

Under Option 3, the US would be prepared to accept international restraints prohibiting, in effect, military use of techniques for climate modification, for any significant ocean modification, for triggering earthquakes or generating tsunamis, or for modifying the weather for hostile purposes. This option would not preclude military use of weather modification techniques solely to protect military forces from natural hazards, or the use of fog modification techniques for search and rescue missions, including missions in enemy territory.

In recommending Option 3, the Department places special emphasis on the importance -- from

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the standpoint of our own national interests -- of seeking to preclude the possibility that, if international restraints are not imposed, efforts could be made to employ as weapons of war future modification techniques which might emerge as the result of further advances in scientific understanding. However, remote this may seem in the case of certain of the "environments" covered by Option 3, we should make every effort to ensure that scientific advances will occur within a framework designed to guard against misconceived efforts which might over time lead to a destabilizing situation internationally.

In contrast with Option 3, Option 2 would leave open the possibility of certain tactical military uses of weather modification techniques for hostile purposes. This might possibly provide a basis for bilateral discussions with the Soviet Union and perhaps for broadly-phrased joint or parallel policy declarations. However, the Soviet Union could not be expected to agree to any formulation which might be construed as condoning US use of weather modification in combat in Southeast Asia or in future conflicts. It would, at best, be difficult to finesse this issue since we would have to make clear publicly at some stage what we meant by "environmental warfare".

Even if a bilateral approach might possibly be based on Option 2, there is no prospect of gaining broad international acceptance of such an approach in view of the hostile uses of weather modification permitted under this option. International acceptance is now even more unlikely in view of the recent official confirmation of the fact that the US employed weather modification techniques in combat in Southeast Asia.

A significant additional disadvantage of Option 2 is that we would not be able to subscribe to a pledge that weather modification techniques

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would be used for "peaceful purposes only" if, as appears probable, this should become a prerequisite for any international guidelines for civil applications of weather modification having cross-border effects. The need for such guidelines is becoming increasingly pressing.

In the Department's view, these disadvantages of Option 2 substantially outweigh the marginal military gains that might conceivably be achieved by employing weather modification techniques as a "weapon of opportunity" in future conflicts.

The Under Secretaries Committee's report notes that, especially in view of the still conceptual character of most conceivable modification techniques, verification of possible restraints on environmental warfare has not as yet been systematically studied. However, the report notes some possibilities in the case of both large-scale and tactical modifications. More systematic research could be pursued if considered necessary. At least in the case of large-scale modifications, the self-interest of nations in avoiding unpredictable and possible irreversible harm should work to support observance of international restraints.

Should violations be detected in tactical situations, consideration could be given to retaliation in kind or retaliation through other means.

We consider it impractical to preclude all military research and development which might possibly have application to various modification techniques. Moreover, there would be no way of precluding the possibility that civil research and development efforts might have military application. We do not believe that these considerations need preclude an effort to develop international restraints on the military use of environmental modification techniques.

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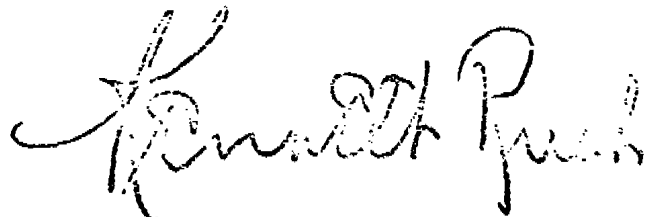
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Although Option 3 should provide a basis for proceeding, it would probably be difficult at this stage to formulate and negotiate sufficiently precise "treaty language" to provide a basis for a formal agreement.

One possibility would be to consider as a starting point broadly phrased joint or parallel policy declarations by the US and Soviet Union based on Option 3.

If the President should decide to move in this direction, any understanding reached with the Soviet leadership on procedural or substantive aspects could, of course, be reflected in the Moscow Summit communique.

Further consideration could then be given to what broader international steps might be desirable.

A handwritten signature in dark ink, appearing to read "Kenneth Rush". The signature is fluid and cursive, with the first name "Kenneth" written in a larger, more prominent script than the last name "Rush".

Kenneth Rush  
Acting Secretary

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No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1



THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D. C. 20301

23 MAY 1974

MEMORANDUM FOR DEPUTY ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY  
AFFAIRS

SUBJECT: Possible International Restraints on Environmental Warfare (U)

(S) The NSC Under Secretaries Committee study entitled "Possible International Restraints on Environmental Warfare" has been reviewed both in the Office of the Secretary of Defense and by the Joint Chiefs of Staff. A memorandum from the Joint Chiefs of Staff setting forth their views is attached.

(S) I share JCS's interest in maintaining full flexibility in the development and possible employment of these potentially valuable techniques. However, I believe that political considerations require that we agree to some restraints in "environmental warfare." I, therefore, recommend that the U.S. adopt a position along the lines of Option 2.

*H. P. Clement*

Attachment 1  
a/s

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No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1

THE JOINT CHIEFS OF STAFF  
WASHINGTON, D.C. 20301

JCSM-186-74

21 May 1974

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Environmental Study (U)

1. (S) Reference is made to:

a. A memorandum by the Chairman, NSC Under Secretaries Committee, dated 10 May 1974, subject: "Possible International Restraints on Environmental Warfare," which transmitted an Under Secretaries Committee study on possible international restraints on environmental warfare. The study outlined options, but the participating agencies reserve their respective positions concerning their preference among the options presented.

b. A memorandum by the Deputy Assistant to the President for National Security Affairs, dated 16 May 1974, subject: "Possible International Restraints on Environmental Warfare," which requested agency views on the options presented in the study forwarded to the President by reference 1a.

2. (S) The Joint Chiefs of Staff recommend that you support Option 1--not to accept any international restraints on military uses of weather, climate, ocean, or terrestrial modification techniques--in order to maintain full flexibility in the development and possible employment of these potentially valuable techniques.

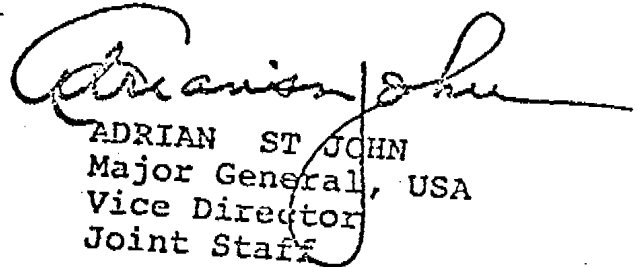
3. (S) Should you feel it necessary for political reasons to accede to the seeking of some restraints on the employment of environmental modification techniques, the Joint Chiefs of

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EXEMPT FROM GENERAL DECLASSIFICATION  
SCHEDULE OF EXECUTIVE ORDER 11652  
EXEMPTION CATEGORY (3)  
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Staff believe that Option 2 would be acceptable. This option gives up only those techniques having long-term, widespread, or especially severe effects and which are not achievable on a controlled basis in the foreseeable future. No serious damage to national military posture would result from being denied their use.

For the Joint Chiefs of Staff:

  
ADRIAN ST JOHN  
Major General, USA  
Vice Director  
Joint Staff

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UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY  
WASHINGTON

OFFICE OF  
THE DIRECTOR

May 22, 1974

MEMORANDUM FOR MAJOR GENERAL BRENT SCOWCROFT  
THE WHITE HOUSE

SUBJECT: Possible International Restraints  
on Environmental Warfare

REFERENCE: Your Memorandum of May 16 Requesting  
Agency Views on the Subject USC Report

ACDA favors an initiative along the lines of Option 3. We feel on balance, however, that it is preferable not to seek overly specific provisions as to what would be included or excluded. At the present time, environmental warfare is not a real threat, and possible future techniques are poorly understood. Specificity may inadvertently exclude a technique that should be included, or vice versa.

Perhaps under the circumstances, it would be preferable to seek a ban on environmental warfare as part of a broader effort of international cooperation on peaceful uses. (Reference my memorandum of April 26, 1974 to Dr. Kissinger). Although a simple ban against hostile uses may have some merit in its own right, standing alone it might appear overly contrived and inconsequential, particularly if it becomes part of current diplomacy.

Instead, an international agreement banning environmental warfare could be part of an international convention on peaceful uses of weather modification. This approach would be analogous to the Antarctica Treaty, which focuses primarily on peaceful uses, but also serves to exclude military uses without an extensive cataloging of specifics.

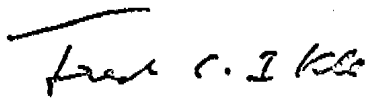
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For example, we might propose to the Soviets an agreement in principle on cooperation regarding questions of environment modification for peaceful purposes. This could be coupled with an invitation to other nations to join the US and the Soviets:

- (1) In working out, through the UN (possibly in the UN Environment Programme or the World Meteorological Organization), multi-lateral arrangements for the exploration and possible application of environment modification technology for peaceful purposes; and
- (2) In exploring, in an appropriate forum, the possibilities of multilateral restraints on military applications of environment modification.

  
Fred C. Ikle

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CENTRAL INTELLIGENCE AGENCY  
WASHINGTON, D.C. 20505

22 May 1974

MEMORANDUM FOR: Major General Brent Scowcroft, USAF  
Deputy Assistant to the President  
for National Security Affairs

SUBJECT : Possible International Restraints on  
Environmental Warfare

REFERENCE : Memo from General Scowcroft, Same Subject,  
dated 16 May 1974

1. The options outlined in this study appear to be appropriate. From the intelligence point of view:

a. Option 1 raises no verification problems, nor would it have any impact on our intelligence operations.

b. Option 2 would in our opinion be verifiable within reasonable limits of error.

c. Option 3 could present formidable detection and verification problems, although some detection would probably occur.

2. We believe that it is proper for this study to exclude consideration of military R&D. In addition to the reasons given in the study, the verification of the absence of military participation in the R&D effort could be extremely difficult for several countries.

  
W. E. Colby  
Director

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| Classified by <u>SSA310</u>  |
| Exempt from general declassification schedule of E.O. 11652, exemption category: |
| (S) (b)(1), (b)(7) (D) (b)(7) (C) (b)(7) (D) (b)(7) (C) (b)(7) (D)               |
| Not automatically declassified on  |
| DATE FOR REVIEW TO DETERMINE   |
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NSC UNDER SECRETARIES COMMITTEE

NSC-U/DM-123

POSSIBLE INTERNATIONAL RESTRAINTS

ON ENVIRONMENTAL WARFARE

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SCHEDULE OF EXECUTIVE ORD. R 11052  
EXEMPTION CATEGORY 3  
AUTOMATICALLY DECLASSIFIED ON date to be  
determined

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NSC UNDER SECRETARIES COMMITTEE  
POSSIBLE INTERNATIONAL RESTRAINTS  
ON  
ENVIRONMENTAL WARFARE\*

This study has been prepared in response to the President's directive of April 26, 1974, to the NSC Under Secretaries Committee.\*\*

The study draws on the April 19, 1974, report by the Department of Defense on "The Military Aspects of Environmental or Geophysical Modification Activity", forwarded to the President May 1, 1974. It also draws on the Under Secretaries Committee's report of February 1972 on "The International Aspects of Weather Modification".

The present study examines:

- The concept of environmental warfare, relationships to civil activities, and relevant policies and proposals; .

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\* This study was prepared by an Ad Hoc Working Group of the NSC Under Secretaries Committee which included representatives of the Departments of State and Defense, the Joint Chiefs of Staff, the Central Intelligence Agency, the Arms Control and Disarmament Agency and the NSC Staff.

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- the status and military utility of techniques for modifying the weather, climate, oceans, the terrestrial environment, and the ionosphere;
- modification programs of other key countries, in particular the Soviet Union, and relevant cooperative arrangements;
- the verification aspects of possible international restraints;
- considerations bearing on the definition of environmental warfare, major options regarding international restraints, and their advantages and disadvantages;
- possible bilateral (US-Soviet) or multilateral approaches to establishing restraints, and the possibility of associating any such restraints with an international cooperative research effort or with international development of guidelines for civil weather

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modification activities having cross-  
border effects.

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## I. ENVIRONMENTAL WARFARE

### A. Concept

The environmental warfare concept has emerged from three principal sources:

- The advancement of scientific understanding (still far from complete) of a broad range of natural processes;
- the recognition of man's ability to intervene in these processes in order to manipulate them, and the development of still highly limited techniques for performing such modifications, especially in the case of weather;
- expectations concerning the further growth of scientific understanding and of modification techniques.

Present or theoretically possible military activities reflecting these factors include protecting military forces from natural hazards, improving the effectiveness of military operations, and inflicting damage.

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There is at present no generally accepted definition of what specific combination of modification techniques and military applications should be regarded as "environmental warfare". Definitional aspects are considered in the discussion of possible options.

B. Relationship to Civil Applications

The scientific and technological advances which provide the basis for the environmental warfare concept derive in large part from civilian programs, especially in the area of weather modification.

Weather modification activities may prove beneficial in a variety of situations. However, international disputes are likely to arise where the effects of such activities extend across national borders and are viewed as disadvantageous by the affected countries.

For many countries, disputes arising from civil applications may prove of greater practical concern than "environmental warfare". The need

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for international guidelines for civil weather modification activities having cross-border effects has been raised in the United Nations Environmental Program (UNEP) and other bodies.

Under foreseeable political circumstances, any international effort to establish such guidelines would probably raise the issue that all weather modification activities should be conducted for peaceful purposes only.

C. Present US Policy

NSDM 165 (May 2, 1972)\*:

- Established guidelines for certain international aspects of US weather modification activities;
- deferred decision on military applications of weather modification; and
- directed that no climate modification activities (civilian or military) be undertaken without specific Presidential approval.

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\* Annex B

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The administration has stated publicly that it would not use techniques for climate modification for hostile purposes even should they come to be developed.

Under civilian authorization, military rain augmentation experiments and operations were carried out in Southeast Asia between October 1966 and July 1972. These represent our only significant operational experience in the military use of weather modification under combat conditions.

#### D. Proposals of Special Relevance

The environmental warfare concept has not been the subject of extended or highly publicized international debate. However, a number of proposals have been advanced by governmental and non-governmental bodies.

On July 11, 1973, Senate Resolution 71, sponsored by Senator Pell, was adopted by an 82-10 vote of the Senate. This resolution expresses the sense of the Senate that "the United

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States Government should seek the agreement of other Governments to a proposed treaty prohibiting the use of any environmental or geophysical modification activity as a weapon of war, or the carrying out of any research or experimentation directed thereto".\* During Brezhnev's meeting with US Senators in June 1973, Senator Pell mentioned this proposal.

In a non-governmental meeting in the US in 1972, the Chief of the Soviet Hydrometeorological Service (Federov) joined in a statement rejecting "attempts to make use of man-made environmental change as a means of waging war" and urging "that an international agreement be sought renouncing the development and use of such weapons".

At a high level, the Soviets have suggested discussing possible restraints on environmental warfare.

The need for some types of restraints has been addressed over the past several years by the

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\* Annex C

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National Academy of Sciences, the National Advisory Committee on Oceans and the Atmosphere, the American Meteorological Society, and the World Peace Through Law Center. The Weather Modification Association, a professional society of practitioners in this field, has supported military use of weather modification techniques, including their use in combat.

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II. MILITARY UTILITY OF MODIFICATION TECHNIQUESA. Basic Considerations

The driving forces of nature are many orders of magnitude larger than those currently producible by man. Although only relatively modest techniques for deliberate man-made changes to natural phenomena are available today, conceivable uses of various modification techniques as leveraging devices in the several environments discussed below could tap larger portions of the energy inherent in dynamic natural processes.

In the case of weather modification, military applications techniques are similar to civilian techniques. No distinctive technology is required. The Department of Defense research and development effort in weather modification is conducted because of two main defense interests: protecting personnel and resources against natural hazards in order to improve operational capabilities, and guarding against technological surprise.

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For the purpose of considering the possible military utility of various conceivable modification techniques, offensive applications are viewed in this section as those involving efforts to inflict damage, harass, or block an enemy within his territory, or to facilitate operations in enemy or neutral territory or international waters by supporting, implementing, or accompanying offensive actions. Defensive operations are viewed as those producing environmental changes only over or in friendly territory for whatever purpose or in international waters to conduct damage avoiding or supporting operations which do not facilitate, implement or accompany offensive actions.

B. Weather Modification

Status

The range of conceivable weather modification activities includes forming, stabilizing, or dissipating fog and low clouds; increasing or decreasing precipitation; moderating, intensifying and steering of severe storms such as hurricanes

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and typhoons, and suppressing or augmenting lightning and hail.

Of these activities, only dissipation of certain types of fogs and modification of the type and amount of precipitation in a given area can be considered operational today. In the latter case, a number of uncertainties as yet remain. Positive but as yet not wholly substantiated assessments -- and growing optimism -- best describe efforts in hurricane moderation and hail and lightning suppression. The possibility of intensifying or steering storms is for the most part a theoretical possibility only.

The Department of Defense currently has only two operational weather modification programs, both dealing with fog dissipation. Defense's current research and development programs are relatively small and deal with fog and cloud dissipation, precipitation modification, dust control, and related mathematical simulations.

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Present and Potential Utility

Precipitation modification techniques might be used in a damage inflicting mode, in the extreme case, to create short-term flooding or drought in order to affect an enemy's capacity to wage war.

In a lesser degree of intended damage inflection, rain enhancement techniques could be used, for example, to wash out tactical bridging equipment or to disrupt airborne operations.

In an harassing mode, rain enhancement might be used for area denial and barrier erection in order to channelize or block enemy attack or logistic routes, or for shielding friendly activities.

The purpose of rain augmentation activities in Southeast Asia from 1966 to 1972 was to make North Vietnamese infiltration more difficult by increasing rainfall in selected areas to soften road surfaces, cause landslides along roadways, and wash out river crossings. These events normally occur during the height of the rainy season.

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Seeding was intended to extend the period of occurrences and to supplement the natural rainfall to maintain poor traffic conditions. While this program apparently had an effect on the primitive road conditions in these areas, the results were limited and unquantifiable. The program apparently contributed to the interdiction mission, although its effectiveness cannot be conclusively established.

In limited circumstances, fog or low cloud stimulation or stabilization might be used to provide cover or limit observation of friendly forces and installations, or to impede enemy surface mobility, hamper air fields, or disrupt airborne operations. Fog dissipation might be used to facilitate launching of air strikes or clear target areas, amphibious operations areas, or search and rescue sites.

If hurricane or typhoon intensification or steering should become feasible at a future time, such techniques might be used during storm seasons

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to deny enemy forces the ability to conduct all or specific types of operations in a given area for a limited time, to create barriers or channelize avenues of approach or retreat, and to inflict damage on enemy forces, military installations and, in the extreme case, economic targets.

These techniques plus moderation techniques might be used to enable friendly forces to use otherwise inaccessible areas, avoid storm damage, and facilitate rescue operations.

Limiting Influences on Military Weather Modification

Militarily useful weather modification would require the conjunction in place and time of three conditions: a tactical opportunity to be gained by using modification techniques, suitable meteorological conditions, and an operational capability in place.

While a deployed operational capability could be made available with necessary investment, training, and doctrine, the coincidence of the other two factors -- suitable meteorological

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conditions and tactical opportunity -- would be fortuitous. For example, rainfall can be significantly induced only where and when there are natural cloud conditions capable of yielding rain, and induced rain could have a significant interdiction effect only where lines of communication were relatively primitive or where lines of communication previously available had been destroyed.

Such conjunctions can occur, however, and the ability to take advantage of them could prove useful to any nation which possessed the requisite knowledge and capability. Nevertheless, since any significant modification activity aimed at inflicting damage or harassing an enemy would be possible only under certain natural meteorological conditions, weather modification can be regarded as essentially a "weapon of opportunity".

C. Climate Modification

Status

Climate modification would involve alteration of long-term climate (as contrasted with short-term

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weather) by extended use of weather modification techniques over long periods and large areas, large-scale physical modification of the earth's topographic features, or changes in the heat balance of the earth and its atmosphere.

Although there is concern about inadvertent effects of human activities on climate, basic understanding of climatic change is limited, and deliberate use of techniques to modify the climate purposefully would have no sound theoretical base.

Climate modification as such is still in the research state (e.g., computer "models" but not experimentation). The Department of Defense has only one computer research program.

#### Potential Utility

Climate modification would have limited military application. The intent of military climate modification would be to handicap severely or possibly destroy an enemy's socio-economic order. A considerable level of overt

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activity over an extended period of time would be involved. This would be detectable. Further, the essential unity of the global climate would make prediction of the totality of the effects of a climate modification effort problematic at best, and the user's own climate could well suffer unforeseen and possibly irreversible deleterious effects.

D. Ocean Modification

Status

Ocean modification would involve alteration of the physical characteristics of the oceans (e.g., currents, waves, temperature/salinity distribution, chemical composition, coastal and bottom topography). In theory, ocean modification might be used in conjunction with weather modification because of the interactions of the overlying atmosphere with the sea surface. These interactions are not well understood today.

At present, no capability or technical basis for a capability exists to alter the ocean

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environment in a controlled, militarily useful manner through modification techniques.

The Department of Defense has no ocean modification programs.

Potential Utility

Ocean modifications, if feasible, would have limited military application because of the probable scope and scale of operations required to produce significant results and, in some instances, the difficulty of maintaining extended effects.

For example, changes in sea surface conditions (e.g., the addition of evaporation suppressants and wave motion suppressants) might, if feasible, inhibit fog formation to facilitate surface or low level air operations, but extended maintenance of these effects would be difficult.

Moreover, apart from changes in sea surface conditions, certain ocean modifications would approximate more nearly climate modification than weather modification. Over the long term, some

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conceptual techniques -- such as shifting the flow of ocean currents -- could significantly alter climate.

Attainment of the degree of control requisite for using ocean modification for military purposes would be unlikely. As with climate modification, all but the most limited forms of ocean modification would be detectable.

#### E. Terrestrial Modification

##### Status

Terrestrial modification would involve the alteration of the earth's physical characteristics (e.g., inducing earthquakes beneath land surfaces or ~~inducing earthquakes~~ or generating tsunamis ("tidal waves")). Altering surface or subsurface magnetic and electrical properties could also be regarded as falling in this area.

Scientific understanding of earthquake mechanisms is increasing. At present, no capability or theoretical base for a capability to alter the inner earth environment in a controlled, militarily useful way exists.

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Defense has no present programs although research on earthquakes has been sponsored in connection with, underground nuclear test detection.

Limited capability for soil modification (for example, to degrade trafficability) exists, and research continues.

#### Potential Utility

If terrestrial modification techniques should become feasible, now unforeseeable military applications might involve, say, modification of the earth's subterranean geomagnetic field.\*

The effects of efforts to induce earthquakes or tsunamis would not be controllable. Consequently, significant military applications are not foreseen.

Soil additives might have utility in limited tactical situations.

#### F. Ionospheric/Geomagnetic Modification

##### Status

Ionospheric/geomagnetic modification would involve creation or intensification of new radiation

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\* Illustratively, the Defense representative noted that navigation techniques based on geo-mag

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belts around the earth through high altitude nuclear bursts, through seeding the ionosphere by rocket or satellite with chemicals or metallic materials to enhance or reduce the reflective characteristics of the ionosphere or produce false targets or screens, or through affecting the ionosphere by means of some ground-based techniques.

Past atmospheric nuclear testing and use of non-nuclear means have augmented understanding of possible ways of producing such modifications. No possibility for controlled modifications can exist until the natural order of things in the ionosphere and magnetosphere are much better understood.

Relevant Defense programs include studies of the impact of ionospheric variations on communications, surveillance capabilities, and ABM "blinding."

Potential Utility

If controllable ionospheric/geomagnetic modification techniques should become feasible, they might have significant military applications in

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enhancing or disrupting radio communications and in affecting certain methods of missile launch detection, tracking, and discrimination; certain types of radar; and spacecraft transmissions.

G. Military Alternatives

Two sets of alternatives could be employed to counter enemy use of environmental warfare techniques: reduce the effectiveness of his techniques through all weather systems; and/or counter his efforts through application of selected levels of other types of military force. Although the purely military advantages to an adversary inherent in the use of some conceivable but not yet possible modification techniques could be significant, these advantages, if detected, could be countered by selected utilization of other military forces to prevent or hamper his efforts.

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III. PROGRAMS OF OTHER COUNTRIES AND RELEVANT  
COOPERATIVE EFFORTSA. Soviet UnionWeather and Climate Modification

The Soviet Union maintains a very large civil weather modification program which, in terms of funding and numbers of people involved, is larger than that of any other country.\*

The scope of the known Soviet effort is generally comparable to that of the US except that it has not involved hurricane modification experiments. On the other hand, the Soviet Union has considerably more experience in Arctic operations.

In general, the Soviet approach has been to engage in repetitive operational efforts until some results have been achieved. Because this approach lacks a firm theoretical base, some Western scientists question the efficacy of certain techniques (such as hail suppression) .

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\* The Soviet program is roughly six times larger than the US Government's effort; however, much of the overall US effort is conducted by state and local governments or privately.

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which the Soviets regard as operational.

Probably the greatest weaknesses in Soviet weather modification programs are in the areas of instrumentation, instrumented platforms, data processing and computer equipment.

The nature and degree of military participation in the Soviet civil weather modification program is an enigma. There is no doubt that much of the program is of interest to the military or that many of the techniques being developed could be applied to military purposes. It has been reported that the Soviet Air Force is funding some projects carried out by the civilian Hydrometeorological Service and some university research.

There is reasonably good evidence that the military is carrying out an independent classified program. Most identified military projects have involved fog and cloud dispersal in the Arctic region.

Although relevant basic research is being conducted, there is no information to suggest that

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the Soviets have a climate modification program at present. The well-known proposal to dam the Bering Strait in order to bring in warm water to melt the Arctic ice cap apparently received some consideration several years ago. However, Soviet scientists pointed out that this could bring about drought conditions in the more temperate regions of the country. Since then, the Soviets have approached the topic of climate modification with caution.

Ocean Modification

The Soviet Union ranks first in the volume of oceanographic data being acquired, but they are believed to trail the US by 5 to 7 years in the quality of their effort. Apart from the Bering Strait proposal, there is no indication that they have had any interest in modifying the ocean environment.

Geophysical Modification

The Soviets have a well-balanced research program in the earth sciences and a broad-scale program aimed at developing a method for fore-

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casting earthquakes. Their overall understanding of geophysical processes is probably about on a par with the US although the quality of their effort is lessened somewhat by the lack of sophisticated instruments and data processing equipment. The only known Soviet plan for any type of modification in this area involves the possibility of creating small artificial earthquakes by pumping fluids into fault zones.

#### Ionospheric/Geomagnetic Modification

The Soviets began to study artificial perturbations in the ionosphere when they conducted high altitude nuclear tests in 1961. They have pioneered theoretical research into the possibility of heating the ionosphere by high energy radio waves and have experimented with the release of chemicals in the ionosphere. Overall, their experience and understanding in this field are believed to be about equal to our own.

#### US-Soviet Cooperation

Scientific exchanges have taken place in

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the field of weather modification, and additional exchanges are planned. No joint projects are currently contemplated.

Under the US-USSR Agreement for Cooperation in the Field of Environmental Protection, cooperation in earthquake prediction research and in basic research possibly applicable to weather modification is planned.

During 1973, the Soviet coordinator for this cooperative agreement (the Chief of the Soviet Hydrometeorological Service) informed the US coordinator (the Director of the National Oceanic and Atmospheric Administration - NOAA) that the Soviets had decided to move into the field of large-scale weather modification and that they planned to utilize heavy aircraft for this purpose. He asked for information about the kind of aircraft NOAA plans for its fleet and for information about instrumentation. This information is being provided.

He also expressed Soviet interest in joining the US in large-scale weather modification

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projects. He was evidently referring to US hurricane modification efforts (Project Stormfury). Since these efforts may be conducted in the Pacific in the future, Soviet participation would unquestionably arouse suspicion and antagonism on the part of the PRC.

B. The PRC

Known Chinese activities generally relate to problems associated with agriculture (rain augmentation and hail suppression). They are handicapped by personnel and instrument deficiencies. In discussions with the Director General of the World Meteorological Organization (WMO), the Chief of the Chinese Meteorological Service recently expressed an ambivalent attitude toward the possibility that US hurricane modification efforts might be conducted in the Pacific.

Their oceanographic efforts have been mainly in near shore areas. They have initiated a high priority effort in seismology to develop an earthquake prediction capability, but no evidence

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exists of research related to geophysical warfare. They have had a long interest in ionospheric characteristics, but no major programs directed at ionospheric modifications have been noted.

C. Others

Various weather modification activities have been undertaken by many other countries. For example, some 17 countries have engaged in rain-making efforts, and 30 have expressed interest in doing so. In addition, a number of countries have engaged in climatological studies.

International cooperative efforts such as the World Weather Program and the Global Atmospheric Research Program are intended to improve the scientific basis for understanding short term and long range changes in weather and climate.

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IV. VERIFICATION

No extensive study of possible approaches to verifying the observance of restraints on the use of various modification techniques has been conducted. Since many of these techniques are conceptual in character, there is little or no basis for seeking to define technical detection systems at this juncture.

However, because of the probable scope and time-scale of the effort, it is unlikely that climate modification techniques could be employed covertly. For the same reasons, any major efforts to conduct covert ocean modifications would probably not go undetected.

Efforts to trigger earthquakes or generate tsunamis would probably require extensive preparations.

It is likely that efforts to carry out the foregoing types of modifications would be observable although identifying particular efforts as being related to modification purposes could prove difficult.

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In the foregoing cases, although detection might well be accomplished, the principal assurance against violations of any international restraints would probably not be verification but rather the unpredictability and uncontrollability of the effects of any attempted violations. The pressure of world opinion would also militate against such violations.

Certain types of ionospheric/geomagnetic anomalies could be recognized as having been artificially created, but preparations would probably not be detected.

In the case of weather modification, some preliminary theoretical and technical studies have been undertaken concerning possible approaches to detection at a distance and detection by sampling. Continuing research might possibly yield a viable technical verification method. However, no research program has been defined, and there is no basis for estimating the cost, practicability, or effectiveness of a "detection system".

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Detection of weather modification efforts might be accomplished through the chance observations (from the ground or from aircraft in the vicinity) of seeding operations coupled with changes in weather conditions. In the case of separate, scattered events, the chance of detection would be low except in the case of fog modification. The chance of observing and identifying repetitive or large-scale seeding operations would be higher. Any ground traces of seeding material could not be reliably detected with present capabilities.

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V. OPTIONS CONCERNING ENVIRONMENTAL WARFARE\*A. Definitional Problems.. Relevant Techniques

As noted above, there is no generally accepted definition of environmental warfare.

All military operations have ancillary environmental effects. In some cases, as in the use of herbicides, the environmental impact is direct and intentional.

The basic distinction between the foregoing cases and the environmental warfare concept is that the latter envisages not only affecting various environments but also releasing or manipulating the processes and forces inherent in them.

Of the several possible categories of environmental modification techniques described in Section II, ionospheric/geomagnetic modification techniques will not be considered here in connection with the examination of possible international restraints. Ionospheric/geomagnetic perturbations can be caused by

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\* With respect to international legal considerations, the ACDA representative expressed the view that some applications of environmental modification techniques might be considered as indiscriminate means

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single or multiple nuclear explosions at high altitude. To attempt to ban these would, in effect, represent an effort to ban nuclear war. Conceptually, it might be possible to prohibit use of non-nuclear techniques although in any international consideration of restraints it might prove difficult to divorce nuclear and non-nuclear techniques. This study has arbitrarily excluded this possibility from further consideration. Should it be decided to pursue comprehensive restraints, the matter could be examined further.\*

In the area of terrestrial modification, techniques most directly relevant to the purposes

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the use of such techniques might be considered an act of aggression under international law. The Working Group did not examine this matter.

\* The ACDA representative expressed the view that this aspect should have been more fully covered in the present study. The ACDA representative also expressed the view that interference with national technical means of verification (for example, through ionospheric or cloud modification) could raise questions of compliance with those provisions of the SALT I agreements prohibiting interference. The Working Group did not examine this matter or the possible applicability of other existing agreements to various modification techniques.

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of this study would be those related to triggering earthquakes or generating tsunamis.

Taking the foregoing into account, the subject matter of possible international restraints on environmental warfare might be considered for present purposes as including military activities in any or all of the following areas:

- Weather modification;
- climate modification;
- ocean modification; and
- terrestrial modification (in particular, efforts to trigger earthquakes or generate tsunamis).

Research and Development of Modification Techniques

Possible international restraints applicable to any or all of the foregoing areas might apply both to relevant military research and development and to military uses, or only to the latter.\*

At least conceptually, it might be possible to prohibit programs to develop military capabilities for conducting any prohibited activities.

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\* The Defense representative expressed the view that there is no suitable alternative to continued research and development of military capabilities for conducting any prohibited activities.

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Any effort to prohibit all conceivably relevant military research and development would, at least in principle, rule out a wide range of activities which might well have no intended application in environmental warfare but which could be important for assessing the potential impact of possible adversary programs in this area and for other security purposes. Moreover, questions might be raised concerning comparable civilian research and development programs. For these reasons, this study has not considered restraints on research and development.\*

Bases for Distinguishing Among Possible  
Military Applications

The following conceptual approaches have been examined with a view to determining whether

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cations of weather modification against US interests.

\* The ACDA representative expressed the view that one approach would be to place all military environment modification research and development under civilian-managed programs which could be followed by the military services in order to maintain their knowledge in this area and to guard against technological surprise. The Working Group did not pursue this matter.

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workable distinctions could be drawn for the purpose of internationally agreed restraints:

- Intent: An effort might be made to distinguish between hostile and non-hostile uses or offensive and defensive uses. There are inherent ambiguities in this approach.
- Purpose: A line might be drawn between the use of modification techniques for damage inflicting purposes and for facilitating military operations. However, depending on the circumstances, there could also be ambiguities in this approach.
- Location: it might be possible to distinguish between uses of modification techniques in ways which would cause environmental changes over or in enemy or neutral territory, over or in international waters, and over or in friendly territory. This might be practical in some cases but not others.

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-- Character of Effects: Those modifications having widespread, long-lasting, or essentially uncontrollable effects might be distinguished from those having essentially temporary and localized effects. It could be difficult under this approach to determine the line between permitted and prohibited rain augmentation activities.

-- Analogies to civilian uses: Where the sole purpose of using modification techniques was to protect military forces and installations from natural hazards there would be a direct analogy to civilian uses although any ancillary effects on enemy forces or territory might be misconstrued.

The formulation of options below has taken into account difficulties in distinguishing among various uses on the foregoing bases.

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Consideration has not been given to "no first use" options since, in specific situations, if an adversary were known to be employing prohibited techniques, responses using various other capabilities might be possible and the question of retaliation (in kind) could be examined.

B. Options

In the near term, the question for decision <sup>is</sup> whether to give favorable consideration to a US-Soviet announcement that the two countries proposed to enter into discussions of possible restraints on environmental warfare. As noted in Section VI below, if such announcement were to be made, it might (or might not) be coupled with a proposal relating to international cooperation in beneficial modification techniques, or a

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proposal relating to the need for international consideration of guidelines for civil environmental modification activities having cross-border effects.

In order to facilitate the near term decision, the immediately following analysis deals only with options respecting possible restraints on military applications. Option 1 would reject such restraints. Options 2 and 3 indicate bases on which discussions might be undertaken if it were decided to pursue the question of restraints.

Option 1:

We should not accept any international restraints on military uses of weather, climate, ocean, or terrestrial modification techniques.

Advantages

-- This would preserve maximum flexibility to determine how useful militarily, possible modification techniques might become, thereby precluding the possibility that we might be ruling out military

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uses of some significance (although the present assessment is that climate, ocean, and major terrestrial modification would have limited military application and would present problems of controllability).\*

- This would also retain full flexibility in the use of current and potential operational weather modification techniques which could have tactical advantages in some situations and which could be important in protecting US forces and installations from natural hazards.

Disadvantages

- This might lead to the emergence of arms competition in the environmental modification area and to heightened

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\* The Administration has already announced that it would not use climate modification techniques for hostile purposes even if they should come to be developed.

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concern that advances in relevant scientific and technological fields might be used to wage war.

- By failing to allay emerging concerns, this approach might hamper future international scientific cooperation in the environmental modification area.
- The need for guidelines for civil environmental modification activities having cross-border effects is receiving increasing international attention. If we wished to join in an international effort to formulate such guidelines and if, as seems probable, proposals were made that environmental modifications should be undertaken for "peaceful purposes only", we would not be able to affirm willingness to limit modifications to such purposes.

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Option 2:

We should be willing to accept international restraints prohibiting "environmental warfare" defined as any military use of weather, climate, ocean , or terrestrial modification techniques having long-term, widespread, or especially severe effects.

Note: This option would preclude the following military uses of modification techniques:

- Any climate modification;
- any significant ocean modification (such as efforts to alter ocean currents);
- efforts to trigger earthquakes and generate tsunamis;
- intensification or steering of hurricanes or typhoons or deliberate generation of tornadic type storms to cause damage;
- continuous and extended precipitation modification having widespread, long-term, or especially severe effects (for example, to cause floods or drought).

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This option would not prohibit localized (tactical) fog modification, or precipitation modification for any purposes other than those prohibited above. It would not preclude efforts to moderate storms solely for protection against natural hazards.

Advantages

- This would rule out the most dangerous and destructive possibilities (the present assessment is that most of these would have limited military application and would present problems of controllability).
- This would preserve those military uses of weather modification which might have significance in some tactical situations.
- This could allay the most prominent domestic and international concerns.
- From the arms control standpoint, this would limit an area of possible competition.
- There would be a reasonable probability of detecting any significant violations of agreed restraints.

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Disadvantages

- We could be criticized internationally for being willing to rule out everything except the things we know how to do (for example, rainmaking for harassing, blocking, or damage inflicting purposes in primitive areas where precipitation modification might be most effective).
- For the foregoing reason, if a multi-lateral arms control agreement were desired, it would be more difficult to negotiate on the basis of this option than on the basis of Option 3 below.
- In practice, especially in the area of storm modification and precipitation modification, it might be difficult to determine whether or not particular actions were permitted.
- If we considered it advantageous to join in any effort to formulate international guidelines for civil environmental

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modification efforts having cross-border effects, this approach would preclude an affirmation of our willingness to limit modifications to "peaceful purposes only" should that issue arise, as seems probable.

-- Militarily, this approach could be viewed as foreclosing possibly significant options at a time when we cannot measure their potential, and as foreclosing possible military advantages we might be able to gain vis-a-vis the Soviets.

Option 3

We should be willing to accept international restraints prohibiting "environmental warfare" defined as precluding -- in addition to those activities precluded under Option 2 -- the following military activities: precipitation modification for harassing, blocking, and damage inflicting purposes; and precipitation or fog modification

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to facilitate harassing, blocking, or damage inflicting actions implemented by other capabilities.

Note: Regarding modifications having effects over or in enemy territory, international waters, or friendly territory, this option would not preclude the use of weather modification techniques solely to protect forces from natural hazards.\* The use of fog modification techniques for search and rescue missions, including missions in enemy territory, would not be prohibited.\*\*

#### Advantages

- In comparison with Option 2, this approach would probably meet with more general acceptance as a definition of "environmental warfare".
- From the arms control standpoint, this approach would be less ambiguous than Option 2, and if a multilateral arms

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\* For example, moderating storms bearing down on friendly forces or lifting fogs from airfields in friendly territory.

\*\* The ACDA representative expressed the view that this exception could, in practice, undermine any prohibition of the use of fog modification to facilitate damage inflicting operations.

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control agreement were desired, this approach would not raise the negotiating problems presented by Option 2 (which would not rule out some hostile uses of weather modification).

- This approach would enable us to affirm that environmental modification techniques would be employed for "peaceful purposes only" if we considered it advantageous to join in developing international guidelines for civil applications of environmental modification techniques having cross-border effects and if the "peaceful purposes only" issue were raised.

Disadvantages

- In addition to foreclosing possibly significant future military options and precluding efforts to gain advantages vis-a-vis the Soviet Union, this approach would foreclose existing and prospective weather modification

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options which might be employed to gain tactical advantage in a variety of conflict situations.

-- This approach would present greater verification problems than option 2 since it would raise the question of verifying whether an enemy was also refraining from employing weather modification techniques in tactical/ localized situations for prohibited purposes.

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VI. APPROACHES TO AN AGREEMENT, AND POSSIBLE  
RELATED INITIATIVES

If a decision were reached that we should be willing to accept international restraints on environmental warfare, a choice might be made between a legally non-binding approach such as declarations of intent or declarations of policy, or a legally binding agreement.

Under either of these approaches, an effort to establish restraints might initially be discussed bilaterally with the Soviet Union and subsequently, if desired, pursued multilaterally in an appropriate forum.

International restraints on environmental warfare might be sought separately or in association with some related endeavor such as the following:

- A call for an international cooperative effort concerned with beneficial uses of environmental modification techniques (this

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would be similar to the approach taken in the Antarctic Treaty which ~~was~~ focussed primarily on promoting peaceful uses and secondarily on limitations on military uses); or

-- an initiative to establish internationally guidelines for civil applications of environmental techniques having cross-border effects.

An important consideration bearing on the foregoing choices is that the PRC would be antagonistic toward any initiative which might be launched as the result of possible joint US-Soviet discussions. While the PRC would not participate in an arms control negotiation based on a US-Soviet initiative, it might participate in some aspects of a broader approach.

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NATIONAL SECURITY COUNCIL

WASHINGTON, D.C. 20506

SECRET/LIMDIS

April 26, 1974

MEMORANDUM FOR

CHAIRMAN, NSC UNDER SECRETARIES COMMITTEE

SUBJECT: International Restraints on Environmental Warfare

The President has directed that a study be made of possible international restraints on environmental warfare.

The study should specifically examine the advantages and disadvantages of promptly initiating discussions with the USSR, or in a broader international context, on such restraints, and should address the following:

- The definition of "environmental warfare" and related terms for such discussions, including options for narrowing the area of discussion to those environmental modification techniques considered practical in this decade.
- The military utility of various forms of environmental modification, including technically and/or politically acceptable distinctions between hostile and non-hostile use.
- The state of Soviet development in environmental modification and its relationship to their capability to engage in environmental warfare.
- The options for various levels of restraint (for example, all use, first use, hostile use, development of capabilities, R&D) and how such restraints might be defined in terms of capabilities or intent. For each of the restraint options, assessment should be made of verification possibilities and their security implications, and the impact on our civil activities and programs in environmental modification.
- Alternative forms an agreement might take (for example, bilateral or multilateral renunciation, treaty, moratoria), possible fora for conducting discussions, and the advantages and disadvantages of various positions the US might take in discussions.

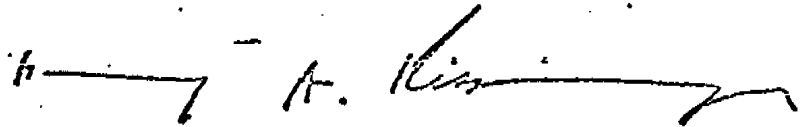
This study should draw upon (1) the 1972 Report of the NSC Under Secretaries Committee on International Aspects of Weather Modification, (2) the report

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being prepared by the Department of Defense on the military aspects of environmental and geophysical modification activity, and (3) the recent briefing by the Department of Defense on weather modification activity in Southeast Asia.

The President has directed that this study be undertaken by the NSC Under Secretaries Committee, with its membership supplemented by representatives of the Arms Control and Disarmament Agency and the Department of Commerce.

Because of the sensitivity of the subject, knowledge of the study and participation in its preparation should be kept on a strict need-to-know basis. The study should be submitted no later than May 13, 1974, for consideration by the President.



Henry A. Kissinger

cc: The Secretary of Defense  
The Secretary of Commerce  
The Director, Arms Control and  
Disarmament Agency  
The Director of Central Intelligence  
The Chairman, Joint Chiefs of Staff

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NATIONAL SECURITY COUNCIL

ANNEX B

WASHINGTON, D.C. 20505

CONFIDENTIAL

May 2, 1972

National Security Decision Memorandum 165

TO:           The Secretary of State  
              The Secretary of Defense  
              The Secretary of Commerce  
              The Director, Arms Control and Disarmament Agency  
              The Director of Central Intelligence  
              The President's Science Adviser

SUBJECT:    International Aspects of Weather Modification

The President has reviewed the Under Secretaries Committee's report on international aspects of weather modification, as forwarded by the Chairman's memorandum of February 12, 1972, and has considered the views of the interested agencies.

In continuing to advance civilian weather modification research and development efforts and to apply this technology for human benefit, the President has decided that:

--   The United States shall further international cooperation and understanding in this rapidly developing field and conduct its programs with maximum openness and within the framework of clearly established operational and procedural safeguards designed to protect the interests of the United States and of other countries.


--   The United States will not encourage requests by other countries for assistance in the conduct of operations involving a high risk of damage or where the effects cannot be foreseen with reasonable assurance. With regard to assisting other countries, each request for assistance shall be considered on the basis of its own merits.

--   The United States shall continue research bearing on climate modification, but no climate modification operation (civilian or military) shall be conducted until its total impact can be predicted with great assurance and without the specific

The No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1  
The Secretary Committee shall be responsible for continuing review of the international aspects of weather modification generally and of U.S. activities affecting other countries or outside U.S. territory, for instituting and overseeing implementation of appropriate guidelines for such U.S. activities, for reviewing any requests from other countries for assistance in weather modification activity, and for reporting any policy issues for the President's decision. For these purposes representatives of other interested agencies will participate.

The President has decided not to propose at this time legislation for the licensing and regulation of weather modification activities.

The President has decided to defer decision on the matter of policy governing military aspects of weather modification.



Henry A. Kissinger

cc: The Secretary of Interior  
The Secretary of Agriculture  
The Administrator, Agency for International Development  
The Director, National Science Foundation

CONFIDENTIAL

Calendar No. 255

93d CONGRESS  
1ST SESSION

## S. RES. 71

[Report No. 93-270]

## IN THE SENATE OF THE UNITED STATES

FEBRUARY 22, 1973

Mr. PELL (for himself, Mr. BAYH, Mr. CASE, Mr. CHURCH, Mr. CRANSTON, Mr. GRAVEL, Mr. HART, Mr. HOLLINGS, Mr. HUGHES, Mr. HUMPHREY, Mr. JAVITS, Mr. KENNEDY, Mr. MCGOVERN, Mr. MONDALE, Mr. MUSKIE, Mr. NELSON, Mr. STEVENSON, Mr. TUNNEY, and Mr. WILLIAMS) submitted the following resolution; which was referred to the Committee on Foreign Relations

JUNE 27 (legislative day, JUNE 25), 1973

Reported by Mr. PELL, with amendments

[Omit the part struck through and insert the part printed in *italic*]

## RESOLUTION

Expressing the sense of the Senate that the United States Government should seek the agreement of other governments to a proposed treaty prohibiting the use of any environmental or geophysical modification activity as a weapon of war, or the carrying out of any research or experimentation directed thereto.

Whereas there is vast scientific potential for human betterment through environmental and geophysical controls; and

Whereas there is great danger to the world ecological system if environmental and geophysical modification activities are not controlled or if used indiscriminately; and

Whereas the development of weapons-oriented environmental and geophysical modification activities will create a threat to peace and w

Whereas the United States Government should seek agreement with other governments on the complete cessation of any research, experimentation, or use of any such activity as a weapon of war: Now, therefore, be it

1     *Resolved*, That it is the sense of the Senate that the  
2     United States Government should seek the agreement of  
3     other governments, *including all Permanent Members of*  
4     *the Security Council of the United Nations*, to the following  
5     *a treaty along the following general lines which will provide*  
6     providing for the complete cessation of any research, ex-  
7     perimentation, and use of any environmental or geophysical  
8     modification activity as a weapon of war:

9     "The Parties to this Treaty,

10     "Recognizing the vast scientific potential for human  
11     betterment through environmental and geophysical  
12     controls,

13     "Aware of the great danger to the world ecological  
14     system of uncontrolled and indiscriminate use of environ-  
15     mental and geophysical modification activities,

16     "Recognizing that the development of weapons-  
17     oriented environmental and geophysical modification  
18     techniques will create a threat to peace and world order,

19     "Proclaiming as their principal aim the achievement  
20     of an agreement on the complete cessation of research,  
21     experimentation, and use of environmental and geo-

1 physical modification activities as weapons of war,  
2 "Have agreed as follows:

3 "ARTICLE I

4 "(1) The States Parties to this Treaty undertake to  
5 prohibit and prevent, at any place, any environmental or  
6 geophysical modification activity as a weapon of war;

7 "(2) The prohibition in paragraph 1 of this article  
8 shall also apply to any research or experimentation directed  
9 to the development of any such activity as a weapon of  
10 war, but shall not apply to any research, experimentation, or  
11 use for peaceful purposes;

12 "(3) The States Parties to this Treaty undertake not  
13 to assist, encourage or induce any State to carry out activities  
14 referred to in paragraph 1 of this article and not to partici-  
15 pate in any other way in such actions.

16 "ARTICLE II

17 "In this Treaty, the term 'environmental or geophysical  
18 modification activity' includes any of the following activities:

19 "(1) any weather modification activity which has  
20 as a purpose, or has as one of its principal effects, a  
21 change in the atmospheric conditions over any part of  
22 the earth's surface, including, but not limited to, any  
23 activity designed to increase or decrease precipitation,  
24 increase or suppress hail, lightning, or fog, and direct

1. . . . .“(2) any climate modification activity which has  
2. . . . .as a purpose, or has as one of its principal effects, a  
3. . . . .change in the long-term atmospheric conditions over  
4. . . . .any part of the earth's surface;

5. . . . .“(3) any earthquake modification activity which  
6. . . . .has as a purpose, or has as one of its principal effects,  
7. . . . .the release of the strain energy instability within the  
8. . . . .solid rock layers beneath the earth's crust;

9. . . . .“(4) any ocean modification activity which has as  
10. . . . .a purpose, or has as one of its principal effects, a change  
11. . . . .in the ocean currents or the creation of a seismic dis-  
12. . . . .turbance of the ocean (tidal wave).

13. . . . .“ARTICLE III

14. . . . .“Five years after the entry into force of this Treaty, a  
15. . . . .conference of Parties shall be held at Geneva, Switzerland,  
16. . . . .in order to review the operation of this Treaty with a view  
17. . . . .to assuring that the purposes of the preamble and the pro-  
18. . . . .visions of the Treaty are being realized. Such review shall  
19. . . . .take into account any relevant technological developments  
20. . . . .in order to determine whether the definition in Article II  
21. . . . .should be amended.

22. . . . .“ARTICLE IV

23. . . . .“1. Any Party may propose an amendment to this  
24. . . . .Treaty. The text of any proposed amendment shall be sub-

mitted to the Depositary Governments which shall circulate  
it to all parties to this Treaty. Thereafter, if requested to do  
so by one-third or more of the Parties, the Depositary Gov-  
ernments shall convene a conference, to which they shall  
invite all the Parties, to consider such an amendment.

"2. Any amendment to this Treaty shall be approved by  
a majority of the votes of all the Parties to this Treaty. The  
amendment shall enter into force for all Parties upon the  
deposit of instruments of ratification by a majority of all  
the Parties.

#### "ARTICLE V

"1. This Treaty shall be of unlimited duration.

"2. Each Party shall, in exercising its national sov-  
ereignty, have the right to withdraw from the Treaty if it  
decides that extraordinary events, related to the subject  
matter of this Treaty, have jeopardized the supreme interests  
of its country. It shall give notice of such withdrawal to  
all other Parties to the Treaty three months in advance.

#### "ARTICLE VI

"1. This Treaty shall be open to all States for signature.  
Any State which does not sign this Treaty before its entry  
into force in accordance with paragraph 3 of this Article  
may accede to it at any time.

"2. This Treaty shall be subject to ratification by sig-

Calendar No. 255

93<sup>rd</sup> CONGRESS  
1<sup>ST</sup> SESSION

**S. RES. 71**

[Report No. 93-270]

## **RESOLUTION**

Expressing the sense of the Senate that the United States Government should seek the agreement of other governments to a proposed treaty prohibiting the use of any environmental or geophysical modification activity as a weapon of war, or the carrying out of any research or experimentation directed thereto.

**By Mr. PHIL, Mr. BAYH, Mr. CASE, Mr. CURTIS,  
Mr. CHASSIN, Mr. GRAVEL, Mr. HART, Mr.  
HOLLANDS, Mr. HUGHES, Mr. HUMPHREY,  
Mr. JAVITS, Mr. KENNEDY, Mr. McGOWAN,  
Mr. MONDALE, Mr. MUSKIE, Mr. NELSON, Mr.  
STEVENS, Mr. TUNNEY, and Mr. WILLIAMS**

February 22, 1973

Referred to the Committee on Foreign Relations

June 27 (legislative day, June 25), 1973

Reported with amendments

1 natory States. Instruments of ratification and instruments of  
2 accession shall be deposited with the Governments of the  
3 United States of America, ; and

4 which are hereby designated the Depositary Governments.

5 "3. This Treaty shall enter into force after its ratifica-  
6 tion by the States, the Governments of which are designated  
7 Depositaries of the Treaty.

8 "4. For States whose instruments of ratification or ac-  
9 cession are deposited subsequent to the entry into force of  
10 this Treaty, it shall enter into force on the date of the deposit  
11 of their instruments of ratification or accession.

12 "5. The Depositary Governments shall promptly inform  
13 all signatory and acceding States of the date of each signa-  
14 ture, the date of deposit of each instrument of ratification of  
15 and accession to this Treaty, the date of its entry into force,  
16 and the date of receipt of any requests for conferences or  
17 other notices.

18 "6. This Treaty shall be registered by the Depositary  
19 Governments pursuant to Article 102 of the Charter of the  
20 United Nations."

DEPARTMENT OF STATE  
WASHINGTON

NSC UNDER SECRETARIES COMMITTEE

SECRET/NODIS  
NSC-U/DM-123

May 10, 1974

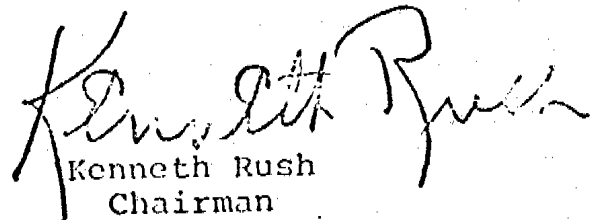
MEMORANDUM FOR THE PRESIDENT

Subject: Possible International Restraints  
on Environmental Warfare

Pursuant to your directive of April 26, 1974 I am transmitting herewith an Under Secretaries Committee study on possible international restraints on environmental warfare, prepared by an Ad Hoc Working Group under the chairmanship of the Department of State.

The study does not present recommendations, and the participating agencies reserve their respective positions concerning their preference among the options presented.

The study has the concurrence of the Department of State, the Central Intelligence Agency, the Joint Chiefs of Staff, the Arms Control and Disarmament Agency, and the National Security Council Staff. Due to the time constraints involved in its preparation, the study does not yet have the formal concurrence of the Deputy Secretary of Defense, which is expected shortly.

  
Kenneth Rush  
Chairman

Attachment:

Study

SECRET/NODIS  
XCDS-3

THE SECRETARY OF DEFENSE  
WASHINGTON, D. C. 20301

1 MAY 1974

The President  
The White House  
Washington, D.C. 20500

Dear Mr. President:

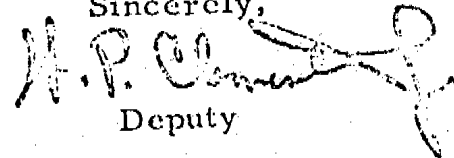
On 25 January 1974, you requested that a study be conducted of the military aspects of environmental or geophysical modification activity. The attached study has been prepared by this Department in response to your request.

The study focuses, as requested, on current activities of the Department of Defense and includes: (1) background on the development of U.S. weather modification policies; (2) current DoD capabilities, operational programs and research and development programs; (3) the potential military utility and significance of modification capabilities; and (4) a discussion of possible alternatives to use of modification technology to achieve military objectives.

The study is essentially a compilation of facts concerning environmental and geophysical modification technology; it highlights the relatively small current capability of DoD in environmental modification. We have expressed the need to continue our research and development programs to protect personnel and property from environmental hazards, and to avoid technological surprise by understanding the potential capabilities of possible adversaries. An Executive Summary is provided at the beginning of the study.

We are prepared to provide such additional assistance in this matter as you may consider needed.

Sincerely,

  
Deputy

Attachment  
A Study of the Military  
Aspects of Environmental  
or Geophysical Modification  
Activity

Classified by Secretary of Defense  
Exempt from General Declassification  
Schedule of Executive Order 11652  
Exemption Category 3  
Declassify On TO BE DETERMINED

A STUDY OF THE MILITARY ASPECTS OF  
ENVIRONMENTAL OR GEOPHYSICAL MODIFICATION  
ACTIVITY, IN RESPONSE TO NSC MEMORANDUM  
DATED 25 January 1974

19 APR 1974

Classified by DDR&E  
Exempt from General Declassification  
Schedule of Executive Order 11652  
Exemption Category 3  
Declassify On TO BE DETERMINED

SECRET

EXECUTIVE SUMMARY

This study responds to a National Security Council (NSC) memorandum of 25 January 1974, which directed a study by the Department of Defense of the military application of weather modification including: types, current programs and capabilities, current and projected research, and alternative techniques.

I. Introduction: The 1972 NSC Under Secretaries Committee (USC) Weather Modification Study Report to the President is summarized.

In response to the USC report, the President, in NSDM 165, adopted the following civilian weather modification policies: (1) research and development will continue; (2) international cooperation and understanding will be furthered and the U. S. will conduct programs with maximum openness; (3) requests for U. S. assistance will not be encouraged, but will be considered on merits by the NSC Under Secretaries Committee established to monitor U. S. weather modification activities; and (4) no climate modification operations will be conducted without specific Presidential approval. A policy decision on military applications was deferred and no action was taken on regulatory legislation.

Since these decisions were reached, the Senate has passed a resolution urging that the U. S. seek an international treaty prohibiting the use of weather modification as a weapon of war. To date, no Executive Branch action has been initiated. Senator Pell held hearings on the

~~SECRET~~

subject in January 1974; in addition DoD provided a classified briefing to Senator Pell's Subcommittee in Executive Session in March 1974.

The Introduction concludes with requisite technical definitions applicable throughout the study.

II. Current Capabilities: At present, no capability exists to alter the environment in a controlled (militarily useful) manner through oceanographic, terrestrial, or ionospheric modification techniques. Accordingly, this section addresses weather modification activities in fog, precipitation, severe storms, and inadvertent weather modification.

The conclusion is that even in the cases of the most advanced knowledge in weather modification technology (fog and precipitation), the state-of-the-art is minimal.

III. Current Operational Programs: Only two DoD programs are operational: Army warm fog dissipation using helicopters, and Air Force cold fog dissipation using airborne dry ice and ground-based propane seeding.

IV. Research and Development Programs: This section describes in detail on-going DoD programs, as follows:

Weather Modification: Army; three small atmospheric programs (two in fog dissipation; one in dust control); Navy; four programs (one in precipitation modification, one in fog dissipation and suppression,

one in inadvertent weather modification, and one in mathematical simulation applicable to weather modification; Air Force; one atmospheric research project in dissipation of warm fog and low stratus clouds.

Climate Modification: One ARPA computer program to exploit current knowledge in atmospheric sciences.

Oceanographic Modification: No DoD programs.

Terrestrial Modification: No DoD programs. ARPA has sponsored research in control of earthquakes related to underground nuclear test detection.

Ionospheric: No DoD programs. However, all the Military Departments are assessing the impact of ionospheric variations on communications and surveillance.

V. Potential Military Utility and Significance: Offensive and defensive applications of weather modification are described, pointing out the possibility of both local and/or large scale techniques. Offensive potential includes harassment, damage inflicting, supporting, and blocking operations. Defensive potential includes direct defensive, supporting, rescue, and damage avoiding operations.

Operations of major military significance are described (change levels of precipitation; stimulate or suppress fog; and intensify or suppress cyclones).

It is concluded that climate modification has limited military application because the magnitude of the operation is unpredictable and such activity would probably be highly overt.

It is concluded that Oceanographic Modification also has limited military application principally because of the scope of operation required to produce significant results.

With respect to terrestrial modifications, it is concluded that current techniques could have significant military application in masking underground nuclear testing, and in aircraft, missile and submarine navigation.

Finally, Ionospheric Modification could have significant military application in disruption of radio communications and missile launch detection, tracking, and discrimination.

VI. Alternatives: This section describes potential (or actual) techniques which permit military operations "in spite of" adverse weather including radar bombing, infrared sensors, improved instrumented landing systems, and improved "all weather" weapons. Additionally, in the event an enemy achieves a significant weather modification capability, which the U. S. is not able to counter through weather technology, alternatives to the threat mentioned include the full range of military capabilities now available from conventional war through strategic nuclear options.

SECRET

No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1

The requirement for continued R&D is stressed as essential lest the U. S. face technological surprise in the military application of environmental modification.

The technical annexes are :

- A. Foreign Activity
- B. Legal Implications
- C. Statement of the American Meteorological Society

Of these, Annex A is particularly significant in detailing the comprehensive Soviet program as well as Peoples Republic of China (PRC) activities.

(5)

SECRET

No Objection To Declassification in Full 2012/02/13 : LOC-HAK-49-1-5-1

2101 - Follow-on (Rewrite)

SECRET/XGDS(3)

2

Pursuant to your decision set forth in the US/USSR Joint Communiqué and the Joint Statement on Environmental Warfare, the draft NSDM at Tab A would instruct the NSC Under Secretaries Committee to prepare a scenario and approach for discussions with the Soviets to begin this October. The NSDM would also reflect a decision that the US approach to these exploratory discussions should be consistent with the restraints supported by OSD and considered acceptable by the JCS.

There may well be some criticism by the Soviets or in any public airing of our approach that we are not including in these discussions the only things we know how to do and have done. Our use of rain-making in SEA has been controversial. That problem should prove manageable, however, and I believe we should have a preference in mind for discussions with the Soviets. The OSD/JCS preference would focus on those restraints which would be subject to reasonable verification. This would not preclude discussions and perhaps a later US decision on broader restraints should our recommended position prove to be non-negotiable.

RECOMMENDATION:

That you approve the NSDM at Tab A requesting a scenario and approach for discussions with the Soviets on measures against environmental warfare and directing that the US approach be consistent with the position supported by OSD and the JCS.

APPROVE \_\_\_\_\_

DISAPPROVE \_\_\_\_\_

SECRET/XGDS(3) Page 2 of Tab 1 rewrttn: Gen S/lds/8-6-74